



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/642,951	08/18/2003	Richard E. Fontaine	09991-042001	4153
26178 7590 05/08/2009 FISH & RICHARDSON P.C. P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022				
EXAMINER NGUYEN, LAM S				
ART UNIT 2853		PAPER NUMBER		
NOTIFICATION DATE 05/08/2009		DELIVERY MODE ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

Office Action Summary

Application No.

10/642,951

Applicant(s)

FONTAINE ET AL.

Examiner

LAM S. NGUYEN

Art Unit

2853

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 January 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 36-80 is/are pending in the application.
- 4a) Of the above claim(s) 36-52 and 58-70 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 53-57 and 71-80 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/S508)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

Claims 71-73, 75, 77-80 are objected to because of the following informalities: The claims depend on claim 52 that has been withdrawn. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 53-57, 74-77 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takamura et al. (US 2002/0033644) in view of Sakata et al. (US 6376772) (With assumption that claims 75 and 77 depend on claim 74).

Regarding to claims 53, 74:

Takamura et al. discloses an apparatus comprising:

droplet ejection device (*FIG. 2*) comprising an element (*FIG. 2, element 57*) to change a volume of a fluid chamber (*FIG. 2, element 63*) of one of the droplet ejection devices, the element having an electrical capacitance (*FIG. 2, element 57*), each droplet ejection device being associated with a plurality of charging resistors (*Abstract and FIG. 11, elements 92-93: The resistors are impedances of transistors 92-93*); and

wherein for each droplet ejection device, a control circuitry provides the respective charge voltage or charge current by selecting a first charging resistor associated with the droplet ejection device to charge an electrical capacitance (*FIG. 11, element 91*) at a first rate followed

by selecting a second charging resistor associated with the droplet ejection device to charge the electrical capacitance at a second rate before discharging the electrical capacitance (*FIGs. 11, 12d, and 12f: The charging resistors (impedance of elements 92 and 93) is selected to change the charge rate shown in FIGs. 12d and 12f*), wherein the volume changing element comprises an electrically actuated displacement device (*FIG. 2, element 57*).

Takamura et al. however does not teach wherein the apparatus comprising at least two different ones of the droplet ejection devices and the control circuitry to effect uniform velocities of droplets elected from the at least two different ones of the droplet ejection devices by providing respective charge/discharge voltages or charge/discharge currents to the volume changing elements to individually control a charge on each volume changing element, wherein the control circuitry comprises charging/discharging control switches to connect or disconnect charge/discharge voltages or charge/discharge currents to respective elements to discharge the respective electrical capacitances.

Sakata et al. discloses an ink jet printer comprising a plurality of droplet ejection devices (*FIGs. 6a-b*) and a control circuitry to effect uniform velocities of droplets elected from at least two different ones of the plurality of droplet ejection devices by providing respective charge/discharge voltages or charge/discharge currents to the volume changing elements (*FIGs. 6a-b, elements 1a-b*) to individually control a charge on each volume changing element (*Abstract and FIG. 8a-b, 15a-b*), wherein the control circuitry comprises charging/discharging control switches to connect or disconnect charge/discharge voltages or charge/discharge currents to respective elements to discharge the respective electrical capacitances (*FIG. 3, elements Tr1-Tr2*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to modify Takamura's printer to include a plurality of droplet ejection devices and individually control each of the plurality of droplet ejection devices in a manner as disclosed by Sakata et al. The motivation for doing so would have been to increase printing throughput by using a plurality of the droplet ejection devices and to suppress the variation in ejection speed of the ink droplets ejected from the plurality of the droplet ejection devices to ensure printing quality as taught by Sakata et al. (*Abstract*).

2. Claims 53-57, 71, 73-79 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang et al. (US 5453767) in view of Sakata et al. (US 6376772). (With assumption that claims 71 and 73 depend on claim 53, and claims 75, 77-79 depend on claim 74).

Regarding to claims 53, 74:

Chang et al. discloses an apparatus comprising:

droplet ejection devices comprising an element (*FIG. 1, element 7*) to change a volume of a fluid chamber (*FIG. 1, element 1*) of one of the droplet ejection devices, the element having an electrical capacitance (*FIG. 12, element 65*), each droplet ejection device being associated with a plurality of charging resistors (*FIG. 12, elements 64, 74*); and

wherein for each droplet ejection device, a control circuitry provides a charge voltage or charge current by selecting a first charging resistor to charge the electrical capacitance associated with the droplet ejection device at a first rate (*FIG. 13: V1*) followed by selecting a second charging resistor associated with the droplet ejection device to charge the electrical capacitance at a second rate (*FIG. 13: V2*) before discharging the electrical capacitance (*FIG. 12-*

13: The resistor 64 or 74 is selected to charge the capacitance 65 during period T0-T1 and period T1-T2).

- Taki et al. does not teach wherein the apparatus comprising at least two different ones of the droplet ejection devices and the control circuitry to effect uniform velocities of droplets ejected from the at least two different ones of the droplet ejection devices by providing respective charge/discharge voltages or charge/discharge currents to the volume changing elements to individually control a charge on each volume changing element, wherein the control circuitry comprises charging/discharging control switches to connect or disconnect charge/discharge voltages or charge/discharge currents to respective elements to discharge the respective electrical capacitances.

Sakata et al. discloses an ink jet printer comprising a plurality of droplet ejection devices (*FIGs. 6a-b*) and a control circuitry to effect uniform velocities of droplets ejected from at least two different ones of the plurality of droplet ejection devices by providing respective charge/discharge voltages or charge/discharge currents to the volume changing elements (*FIGs. 6a-b, elements 1a-b*) to individually control a charge on each volume changing element (*Abstract and FIG. 8a-b, 15a-b*), wherein the control circuitry comprises charging/discharging control switches to connect or disconnect charge/discharge voltages or charge/discharge currents to respective elements to discharge the respective electrical capacitances (*FIG. 3, elements Tr1-Tr2*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to modify Chang's printer to individually control each of the plurality of droplet ejection devices in a manner as disclosed by Sakata et al. The motivation for doing so

would have been to be able to suppress the variation in ejection speed of the ink droplets ejected from the plurality of the droplet ejection devices to ensure printing quality as taught by Sakata et al. (*Abstract*).

- **Chang et al. also discloses the following claimed inventions:**

Regarding to claim 57: wherein the volume changing element comprises an electrically actuated displacement device (*FIG. 1, element 7*).

Regarding to claims 71, 73, 78-79: (Assumed that claims 71 and 73 depend on claim 53) wherein selecting a first charging resistor comprises selecting a first charging resistor that consists of two terminals, and selecting a second charging resistor comprises selecting a second charging resistor that consists of two terminals (*FIG. 12: Each of resistors 64 and 74 has two terminals*), wherein providing a respective charge voltage or charge current to the volume changing element comprising providing a respective charge voltage or charge current to a first terminal of the volume changing element (*FIG. 12, element 65*), and the method further comprises connecting a second terminal of the volume changing element to electrical ground (*FIG. 12, element 65: The lower terminal of capacitor 65 is connected to ground*).

3. Claims 72 and 80 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang et al. (US 5453767) in view of Sakata et al. (US 6376772) and further in view of Yonekubo et al. (US 2003/0058302). (With assumption that claim 72 depends on claim 53, and claim 80 depends on claim 74).

Chang et al. discloses the claimed invention as discussed above except unselecting the first charging resistor so that the electrical capacitance maintains the first voltage for a preset amount of time.

Yonekubo et al. discloses an inkjet printer comprising a capacitance droplet ejection device driven so that after a first rate of charge to a first voltage (*FIG. 8, period Sb11*), the first voltage is maintained for a preset amount of time (*FIG. 8, period Sb12*), then a second rate of charge to a second voltage before discharging.

Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to modify Chang's control circuitry to drive the resistors in a way so that the droplet ejection device is driven in a manner as disclosed by Yonekubo et al. The motivation for doing so would have been to temporarily maintain the pressure in the pressure chamber at a moderately reduced pressure during the expansion of the pressure chamber to ensure the pressure change in the pressure chamber as taught by Yonekubo et al. (*column 19, lines 40-45*).

Response to Arguments

Applicant's arguments with respect to claims 53-57 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAM S. NGUYEN whose telephone number is (571)272-2151. The examiner can normally be reached on 7:00AM - 3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, STEPHEN D. MEIER can be reached on (571)272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/LAM S NGUYEN/
Primary Examiner, Art Unit 2853